Scientific Museum.

Glaze for Common Earthenware.

The glaze usually employed for common kinds of earthenware is compounded of litharge of lead and ground flints, in the proportion of ten parts by weight of the former to four parts of the latter. Cornish granite is sometimes substituted for flint, and used in the proportion of eight parts to ten of litharge. This method of glazing is objectionable, on account of the injury which, notwithstanding every precuation that can be taken, it occasions, in its applicatian, to the health of the workmen employed, who frequently are seized with paralysis; and because the lead, which is soluble by means of acids, and highly poisonous, renders vessels thus glazed improper for preparing or containing many articles of human food.

The bad effect of raw glazes upon their health, is greatly lessened to the workmen when they can be brought to the frequent use of ablutions. In every pottery the men employed in glazing should be, and in most establishments they are, plentifully supplied with soap, which they are enjoined to use on every occasion of quitting their work. Unfortunately, however, the workmen themselves have become erroneously impressed with a belief in the superior efficacy of ardent spirits in warding off or counteracting the poisonous effects of lead, and fly to the use of this as a specific, to a degree which too often proves, both physically and morally, worse than the evil which it is intended to prevent.

The mixtures just mentioned are called raw glazes; their employment is convenient to the potter because of their cheapness and extreme fusibility. Flint, which remains unaffected in the focus of the most powerful lens, is, when combined with lead, melted and vitrified at a comparatively low heat. The method of using this glaze is to reduce the ingredients to the state of a fine powder, and throw them into as much water as will make them of the consistence of cream. The mixture must be well stirred, that the powders may be always kept uniformly blended throughout the fluid. The pieces are first brushed to free them from dust, and then merely dipped into the liquid and withdrawn, when they must be turned rapidly about in all directions, that the glaze may flow equally over the whole surface. The superfluous liquid having been allowed to drain off for a few seconds, and the pieces having been set on a board during a few minutes, they are ready for insertion in the seggars.

Chaptal in his "Chemistry applied to the Arts," has given a process for forming white enamel, which answers well for glazing the superior kinds of earthenware and tender porcelain. Equal parts of lead and tin are kept in fusion until completely oxidated. The powder thus formed is ground with water, all impurities are removed by repeated washings, and being dried it is kept for use. The whitest flints are then chosen, and used with carbonate of potash, the latter being in such proportion to the flint, that the mixture will be soluble in water. To the solution of flint thus made, muriatic acid must, from time to time, be added, until no further precipitation occurs. The precipitate thus obtained is pure silex, which, being washed and dried, is also fit for use. If then one part of this silex, and one part of the metallic oxide, be added to two parts of carbonate of potash, and the whole be fused in a crucible, the mass need only be reduced to a fine powder to prepare it for use in glazing.

On the Action of Water on Leaden Cisterns.

Lead does not ozidize either in dry air or water deprived of air, but oxidizes in water in proportion to the quantity of oxygen it holds in solution; this oxidation is probably facilitated by the presence of nitrates, which are partly reduced by the lead.

The organic substances in water may act in two ways: when they are in a state of suspension they ferment the disengagement of the air,—on the contrary, when dissolved in water they fix the oxygen in solution, and may even reduce a portion of the nitrates or sulphates present.

The infusoriæ which are oftentimes found in water, and which disengage oxygen, abound especially in warm weather,—consequently the waters exercise only a feeble dissolving action on the oxygen of the atmosphere.

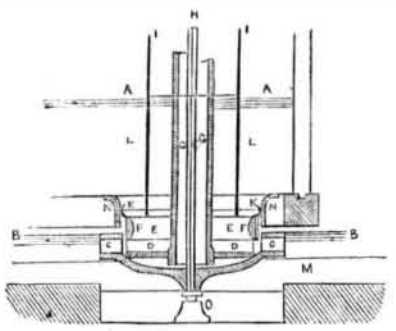
The alkaline muriates contained in water attack lead only when these waters are deprived of air. Generally speaking, the presence of salts diminishes the action of water on the lead, inasmuch as they weaken the affinity of the water for air and saline substances.

For the Scientific American.

Hydraulics.

(Continued from page 168.)

Fig. 26.



Fourneyron's Turbine.—This kind of wheel is the invention of a M. Fourneyron, a Frenchman. Figure 26 is vertical section of a *turbine*. A is the surface of the water in the upper level; B B the surface in the lower level; C C are the curved buckets of the wheel; D D is a fixed disc and curved guides firmly supported by the shaft pipe; E is the annular sluice gate, with wooden cushions, F F; H is the shaft upon which the wheel is firmly fixed at the lower part. This shaft runs upon a suitable step at O. I I are two vertical rods which are attached to an annular sluice gate to raise and depress the gate by gearing; K K is a leather collar, extending around the upper surface of the annular sluice gate; it is pressed outwards by the water against the concave surface of the concentric fixed cylinder, N; this prevents leakage. L L is the water forebay; the water by it has free communication with the sluices of the turbine; M is the tail race.

Fig. 27.

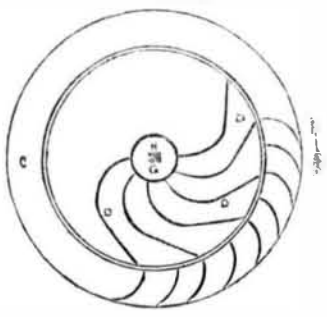


Figure 27 is part of a horizontal section of this turbine; C C is the wheel turning in the direction of the arrows; D D is a fixed disc, with its curved guides attached, the spaces between which are the sluices whence the water issues and presses upon the curved buckets of the wheel; G is the shaft pipe, which sustains the fixed disc in an unchangeable position upon its lower extremity, and is itself sustained at its upper end by the carpentry above the forebay; through this pipe the shaft of the wheel, H, rises to communicate motion to the works driven by the turbine; the open annular space between D and C represents the place of the sluice gate, which is a short portion of a thin hollow cylinder of cast iron, moving vertically, in contact with the fixed cylinder, N N, at its upper part, and closing down water tight upon the fixed disc; wooden blocks are screwed upon the inside of the annular sluice gate, which slip between the curved guides and are rounded above and below, in order to improve the ajutage, and thus facilitate the efflux of the water. The fixed disc, D, is surmounted by a series of curved guides, whereby the water is conducted to the wheel and made to issue tangentially, (hence the name turbine, whirling shell) and press upon the curved buckets perpendicularly, thus producing a rotary motion in the wheel. The admission of the water from the upper level, to act upon the wheel, is regulated by the annular sluice gate, which envelopes the curved guides and shuts down upon the fixed disc. When this sluice gate is raised, the water issues out between the curved guides into the buckets, C, and turns the wheel. When this gate is closed no water can pass to the lower level. This wheel is made of cast iron, all of one piece, if necessary, and runs well when immersed in water.

Manufacturing Bank Notes.

A block of thick plate steel is softened on the upper side; the device is engraved on this softened surface; the block is hardened by a careful process after the engraving; the device is transferred from the hardened block to the convex surface of a small soft steel roller, by intense pressure; the roller is hardened, and the device is transferred from it to any number of softened steel plates; these plates are hardened after the transfer, and are then in a state to be printed from. By this beautiful train of operations, one originally engraved block is made to suffice for an almost endless number of engravings. The mode in which the writing, the emblems, and the ornaments are combined in a bank-note, is so planned as to render forgery difficult. The numbering is a remarkable process, as now performed.—* * * * Four wheels, each divided by ten notches, leaving a facet between each pair, engraved with consecutive numbers from 1 to 0, are placed upon a shaft; a portion of their breadth being turned down about one-half of their depth, having a boss or collar between every two. Upon these bosses, and filling up the spaces, rest latches; and over each wheel is a pall, the width of the first being equal to that of the unit wheel, and the breadth of the others equalling that of the wheel and latch. the palls are driven by a crank; by each revolution of which the first wheel is moved through a space equal to one-tenth of its entire circumference, bringing regularly forward the numbers from 1 to 0. When the figure 0 is reached, the latch of the second wheel is depressed, and the wheel moves forward one division making the tens. The same process is repeated with regard to the other wheels, and thus any amount of numbers can be registered, by simply increasing the number of wheels in proportion. Machines of this kind are extensively adopted in the Bank of England; with, of course, an inking apparatus to apply to the types. A patent was taken out in 1844 for a mode of printing bank-notes intended to obviate the liability to forgery. The surface is covered with two designs, one geometrically regular, and the other very irregular; the two designs are engraved on different plates, and are printed with different inks, the one with visible and the other with invisible ink. Both of the inks are delible or removeable by chemical means; and the usual engraving of a bank note is printed on paper so prepared. The rationale of the suggestion is this—that whatever means a forger might take to alter, by chemical agency, the letters or figures, or to transfer them by lithographic or anastic processes, the state of the paper would betray him; for he would remove some parts of the design in the one case, and fail to transfer in the other.

Religious Insanity.

Pure and undefiled religion, whose genial influences shed peace and joy over the path of our existence, and light us with elevated hopes to the prospects of a happy eternity, can in its unperverted results have no injurious effects on the mind. The caviller may accuse religion of producing insanity, but he does not see how many causes of insanity it averts—how much comfort it affords to the weary and heavy laden—how effectually it buoys the desponding, and how directly it points to the transgresser the way of pardon and peace. As the result of some attention to this matter, we feel satisfied that the true remote cause of insanity very frequently lies behind the religious influences which appear so conspicuous, and that, at most, religion can only be accused as the occasional and exciting cause of a disease whose condition is completely established in the system; that in a great many of these cases the mental derangement will be found mainly to depend upon ill-health, or that peculiar debility and irritation of the nervous system which so frequently follows various acute disorders, that severely try the organic structure, and not in a few instances, so far is the disease of the mind from a religious origin, that it is clearly and properly chargeable to an indulgence in vicious habits.

Lord Elgin has stated in reply to an address from the grand jury, that the government will certainly move to Quebec after the completion of its two years in Kingston.

The Cannelton Cotton Mill, Indiana, is now in operation. It employs 100 hands.

LITERARY NOTICES.

Annals of Albany: by Joel Munsell.—This is a book full of interest to all the Knickerbockers; it is now in its second volume, and all those who would desire to be thoroughly acquainted with the Rensselaer Grants, and the founding of the Colony of New Netherlands, should have it. The old Dutch manners are pourtrayed in a graphic manner The minuteness of detail, and the rigid adherence to facts, are characteristic of Mr. Munsell,

Mechanics' Pocket Companion and Tabular Vade Mecum.—Among the multitude of "Mechanics' Pocket Companions," this one is truly a Pocket-Book. Its author is Henry W. Heywood, of Claremont, N. H., who has, by an unfortunate accident, been deprived of the ability to labor at his daily toil for life. The book is a very practical one, and embraces a great deal of useful information for every mechanic: it is a 'Ready-Reckoner,' and is the most convenient one that we have seen. We hope that our mechanics will give it a wide-spread patronage for the sake of their infirm brother-craftsman. Its price is 40 cents; 32 mo. 128 pp. Five copies will be sent, postage free, for $2. It is in leather tuck. Address the author, post-paid, at the above place.

Hunt's Merchant's Magazine.—The February number of this valuable Magazine contains a mass of most able and useful matter. It presents nearly the whole sermon of Mr. Beecher on "The Benefits and Evils of Commerce;" and there is a grand article on "The Influence of Commerce upon Language," by A. R. Rider, Esq., of this city. There is no work in this or any country which presents so many useful statistics, upon every subject, as Hunt's Merchants' Magazine.

Iconographic Encyclopedia.—Parts 15 and 16 of this splendid work are now published and ready for sale by Mr. Rudolph Garrigue, No. 2 Barclay st., this city. Part 15 relates to implements, munitions of war, drill, taking of cities, fencing, &c. Part 16 illustrates ship-building in all its branches, and exhibits the nautical skill of every nation. Fortification is also illustrated, and that in a beautiful manner.—No work of the same nature was ever presented to our people, so beautiful as this—no other can compare with it in any respect. The engravings are very fine, and the work, when completed, will form a very excellent library of knowledge in itself.